196 Prevalence of undiagnosed pre-diabetes and diabetes in a UK cohort of young people with cystic fibrosis

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Objectives: To determine prevalence of diabetes (DM) and prediabetes (PD) in young people not diagnosed with CFRD from the UK national data set.
Methods: The UK national CF data set (2007 to 2012) recording annual height, weight, BMI, % predicted FEV1 and FVC, and HbA1c was interrogated. Young people up to age 23 yr were included. HbA1c values >6.5% and 5.7–6.5% were used to define 'undiagnosed' DM and PD, respectively in patients not labelled as having CFRD. Prevalence of PD and DM and %FEV1 were determined by age group using the first visit values for each individual.
Results: 3759 patients (1627 males, 87.5% with DF508 mutations, median (range) age 14.5 (4.5–23)y were included. Prevalences of known CFRD, and undiagnosed PD and DM are shown in Table 1.

Table 1: Prevalences of known CFRD and undiagnosed (pre)diabetes in 3759 patients at first encounter

	Age group		
	5–10 yrs (n = 801)	11–16 yrs (n = 1121)	17–23 yrs (n = 1837)
FEV1 mean, % [SD]	89.8 [17.0]	80.9 [18.9]	70.5 [24.1]
BMI SDS mean [SD]	+0.05 [1.0]	–0.11 [1.1]	–0.45 [1.2]
Known CFRD, n (%)	16 (2)	122 (10.9)	485 (26.4)
Undiagnosed prediabetes (HbA1c 5.7–6.5), n (%)	300 (38.2)	445 (44.5)	617 (45.6)
Undiagnosed diabetes (HbA1c >6.5), n (%)	14 (1.8)	58 (5.8)	89 (6.6)

In cross-sectional analyses adjusted for gender, age, genotype and BMI, %FEV1 was inversely associated with HbA1c, B = –5.0 (95% CI –6.0 to –3.0, $p < 0.0001$). HbA1c accounted for 22% of the variance in FEV1.
Conclusion: In this large UK data set, an additional 6.6% of CF patients aged 16–23 y would be diagnosed with diabetes based on HbA1c values. Furthermore, the prevalence of PD was high across all age groups and was associated with lower %FEV1.
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197 Comparison of FRAX/NOGG with UK Cystic Fibrosis Trust guidance for low bone mineral density in cystic fibrosis

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Objectives: The World Health Organisation FRAX® tool (http://www.shef.ac.uk/FRAX/) estimates 10 year fracture risk based on clinical and bone mineral density (BMD) data, but is only validated in ages 40–90 years. We compared UK National Osteoporosis Group Guidelines (NOGG) treatment recommendations based on FRAX 10 year fracture risk and age with those based on UK CF Trust (CFT) guidelines.
Methods: The FRAX tool was used to estimate 10 year risk of major fracture based on gender, smoking, steroid use, history of previous fracture, body mass index (BMI) ± DEXA BMD for Bristol Adult CF Centre (UK) patients >18 years old. NOGG treatment recommendations based on FRAX 10 year risk and age were compared with those from CFT Guidelines.
Results: 103 patients (53 males) with mean age 29 years (range 18–59) had complete data sets. 37% had significant steroid use, 9% smoked and 2% had previous fracture. There was agreement between FRAX/NOGG (with BMD) and CF trust guidelines in 93 cases (90%); discordance was not associated with age, steroids, previous fracture or BMI. Where FRAX/NOGG without BMD measurement estimated low risk of major fracture (n = 10), recommendation not to intervene was not affected by BMD measurement and was concordant with CFT guidelines.
Conclusion: There is good correlation between FRAX/NOGG and CF Trust treatment recommendations for low BMD. FRAX 10 year fracture risk may be a useful concept for discussing treatment options with people with CF (who often have a high treatment burden) particularly in younger/low BMI patients who may not have reached peak BMD. Those with low risk FRAX 10 year fracture estimates before BMD measurements may not require DEXA.

198 The prevalence of ΔF508 in cystic fibrosis patients with low bone mineral density in Republic of Macedonia

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Introduction: Reduced bone mass density (BMD) is frequent in patients with cystic fibrosis (CF). Pathogenesis of CF bone disease is multifactorial. Many studies suggest that there is genetic component, independent of the disease severity and nutritional deficits.
Aim: To determine the prevalence and identify determinants of reduced BMD in CF patients.
Material and Methods: The study included 79 CF patients (range 5–36 y.). BMD was measured via dual-energy x-ray absorptiometry (DXA) scan. Vitamin D level was assessed by plasma 25OHD levels (<10 ng/ml and <20 ng/ml) were defined as severe and mild deficiency.
Results: 41 CF patients were homozygote for ΔF508del mutation, 68.4% have lower BMD (–2.1 ±0.25SD), 7 with severe osteoporosis. 25OHD was <10 ng/ml in 7.3%, and <20 ng/ml 39% homozygote CF patients. In group with heterozygote for ΔF508 (29 CF patients) 74% have low BMD (–1.7 ±0.3SD), 7 with osteoporosis. Severe deficiency of 25OHD <10 ng/ml have 13.8% and 51.7% have levels <20 ng/ml. 9 CF patients have other mutations, 62.5% have low BMD (–0.56 ±0.3SD), 2 of them have osteoporosis. There was none patient with severe deficiency of 25OHD, and 33% has levels <20 ng/ml.
Conclusion: The ΔF508 del genotype was associated with lower value of BMD. Reduced bone mineral density in cystic fibrosis is associated with a number of factors including ΔF508 del genotype, deficiency of vitamin D, lung disease severity and malnutrition.

199 Arterial stiffness in an ageing cystic fibrosis (CF) population attending the All Wales Adult Cystic Fibrosis Centre (AWACFC)

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Background: The life expectancy of patients with CF is increasing and as a result so is the risk of secondary complications. Ageing, systemic inflammation and CF-Related Diabetes (CFRD) are all cardiovascular risk factors seen in CF patients. Arterial stiffness is a marker of cardiovascular risk and is independently related to ageing, systemic inflammation and diabetes in non CF patients. We hypothesized that arterial stiffness would be greater in the adult CFRDM population compared to CF normal glucose tolerant subjects (CFNGT) and healthy non-CF controls.
Methods: Arterial Stiffness, measured by augmentation index (Aix) and pulse wave velocity (PWV) (SphygmoCor), blood pressure and lung function was measured in 64 CF adults from the AWCFC. Sixteen healthy age matched non-CF controls were recruited. Non-parametric and parametric tests were used in the analysis of results.
Results: Patients with CF had greater Aix and PWV than controls ($p < 0.05$) but were similar in age, BMI and mean arterial pressure. Of the CF population, 42 had CFRD or CF impaired glucose tolerance (CFIGT) and 22 had CF with normal glucose tolerance (CFNGT). They were similar in age, BMI, lung function and blood pressure. Patients with CFRD/CFIGT had greater mean (SD) aortic PWV, 6.1 (1.6) than the CFNGT group, 5.4 (0.7) ($p = 0.03$).
Conclusion: The results show increased arterial stiffness as measured by Aix and PWV is present in CF and to a greater degree in CFRD in comparison to healthy controls. The finding of increased PWV suggests premature vascular ageing within the CF population. Greater awareness of cardiovascular risk prevention is therefore needed in this population.